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ABSTRACT

This bulletin describes 46 of the more common trees found in Minnesota's forests and windbreaks. The bulletin contains two tree keys, a summer key and a winter key, to help the reader identify these trees. Besides the two keys, the bulletin includes an introduction, instructions for key use, illustrations of leaf characteristics and twig characteristics, and a tree road map. Trees such as butternut, black walnut, bitternut hickory, honey locust, red maple, box elder, tamarack, black ash, green ash, balsam fir, and red pine are contained in the guide. To further help identify these trees, and to act as a cross check of the key, illustrations of the leaf and twig, or needle group and cone, along with the key features of the species, are also included. (TK)

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MINNESOTA'S FOREST TREES

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AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF MINNESOTA

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Summer and winter keys for use in 4-H and school forestry projects in the identification of 46 common forest and windbreak trees of Minnesota.

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Minnesota's Forest Trees

INTRODUCTION

The importance of Minnesota's forests is obvious when one realizes that the production and processing of wood and wood fiber is the third largest industry in our state. Tourism and recreation depend to a large extent on our forests. The retention of water and soil and the habitat for much of Minnesota's wildlife is directly dependent on forest cover. Windbreaks are planted and maintained to protect our farmsteads and croplands.

When the first settlers came to Minnesota, our state had about 31.5 million forested acres in a total land area of 51.2 million acres. With the development of agriculture and other land uses, forested lands now cover about 19.1 million acres. Tree planting is restoring some of our nonforested lands, and more trees — principally red (Norway) pine — were planted from 1955 to 1969 than in all former years combined.

The forest is a fundamental part of our environment and the ecological processes within the forest depend on the management of Minnesota's forest land. To learn of these processes, forest management techniques, and the forest environment, we must recognize the members of our forest community: the trees, shrubs, grasses, and other flora; the animals, birds, and other fauna.

HOW TO USE THIS BULLETIN

This bulletin describes 46 of the more common trees found in Minnesota's forests and windbreaks. These may be identified by their specific characteristics through a process of elimination known as "keying out" a tree. A key is a series of steps toward identification.

Let's illustrate how a key is used by making a "people" key. Suppose you have six friends in your neighborhood and you wish to use a key to describe them to your mother. You could use the following "people" characteristics.

1. Blond hair
   2. Blue eyes — Olaf
   2. Brown eyes — Fred

1. Brown hair
   3. Blue eyes
      a. Big feet — Pat
      b. Small feet — Ed

   3. Brown eyes
      a. Fat — Joe
      b. Skinny — Don

You can explain to your mother that two of your friends, Olaf and Fred, have blond hair. You can further identify Olaf by his blue eyes and Fred by his brown eyes. Four of your friends have brown hair. Pat and Ed have blue eyes, but Pat has big feet and Ed has small feet. Joe and Don have brown eyes, but Joe is fat and Don is skinny.

A tree key works exactly the same except that we use leaves, fruit, flowers, bark, twigs, and other characteristics.

Trees are divided into two main categories: those which have cones (conifers) and leaves which are usually needlelike and green the whole year (evergreens); and those which lose leaves in the winter (deciduous) and have broadleaves (broad leaf).

The conifers are sometimes referred to as softwoods and the deciduous trees as hardwoods. These are confusing terms since the hardness of the wood is not really an identifying characteristic between the two categories. So let's simplify this by calling our two main groups CONIFERS and DECIDUOUS trees.

In summer we can find more tree characteristics than in winter, but to identify trees the year round, let's use a SUMMER KEY and a WINTER KEY.

The place to study trees is in the forest or woodlot; take this bulletin along and look for the characteristics — bark, twigs, buds, leaves, and fruit.

Pay close attention to the bark. Color, texture, whether smooth or furrowed, scaly or firm, all are bark characteristics.

The twigs are interesting to study in the wintertime. They, too, vary in color; some are brittle, while others are tough and pliable; some are slender, while others are coarse. A taste of the twig often helps to identify the tree, as for example, the cherries or yellow birch.

The buds go along with the twigs as part of the winter study of the trees. It may be important to be able to recognize a forest seedling in the early spring before the leaves are out. This would be true if it were a valuable forest tree, such as a black walnut, and it was desired to cut around it to give it more light. In such instances, the buds are a helpful means of identification.

Study the winter twigs carefully. It is obvious that hickories, maples, and ashes have a terminal bud. But you must look closely when the basswood, elms, and birches are found. They may look as if they had a terminal bud, but on closer examination it is evident there is really a leaf scar on the end of the twig and the bud is a little below and to one side. The color of buds indicates at once whether the tree is a red, silver, or sugar maple.

As you study and compare leaves, look for the following points: Are they simple (one leaf to a stem) or compound? Are they arranged opposite on the twig or alternate? How is the margin of the leaf shaped? This is most important. In some leaves, the margin is *entire* (no breaks at all); in some, it is like the fine teeth of a carpenter's saw and is called *serrate* (saw-like); still others are *doubly serrate;* in others, the margin is more deeply notched, as in the big-toothed aspen, and these we call *toothed*. Then come the oaks and some others in which the margin is very deeply cut. These leaves are described as *lobed*, and the hollows between are called clefts.

Trees have flowers, but usually the blooms are high up in treetops where you cannot easily see and identify them. Then, too, they are only present for a very brief season, so flowers are not used in the keys.

The fruit of the forest trees is an important item in forest appreciation, not so much as a means of identifying the tree, but as recognizing the seeds from which the different forest trees grow. Fruit does not necessarily mean fleshy, edible products, such as apples or cherries, but includes any seed and the covering in which it develops, whether cone, pod, samara (winged-seed), bur, or husk.

Learning to know the names of your "tree neighbors" is like playing a detective game. With certain "clues," such as color of the bark, size and branching of the twig, shape of the bud, and form of the leaf, tree names can be "tracked down."

You will note that the common name of a tree is followed by a Latin or scientific name. All living things are so named because their common names may vary from state to state, and country to country, but the scientific name is always the same. It's the common name you want to remember. An example: Minnesota's state tree is called Norway pine in Minnesota, but red pine in other parts of the country. But it has only one scientific name wherever it might grow — Pinus resinosa.

Here's an example of how the key works.

Look first at the "Summer Key to Minnesota's Trees" on page 6.

Notice that there are two item 1's. The first, 1, says, "Leaves needle like, awl shaped, or scale like; usually evergreen." The second, 1, says, "Leaves broad, thick; not persistent over winter." Here you must make a choice. Suppose that the tree you are trying to identify is a red pine. This will cause you to choose the first, 1.

Then, you're ready for the second step. The next number in the key is 2. Again, there are two, 2's. The first 2 says, "Leaves needle like," the second 2 says, "Leaves awl shaped or scale like." The first 2 describes your tree's leaves.

You'll choose from the 3's next, "Needles borne in clusters," or "Needles borne singly, persistent year-round." Looking at your tree samples, you'll see that the first applies. Continue through all the numbers and you will have identified a red pine.

LEAF CHARACTERISTICS—SUMMER KEY

KIND

NEEDLE LIKE

SCALE LIKE

LINEAR

AWL LIKE

BROADLEAF

ARRANGEMENT

ALTERNATE

OPPOSITE

FORM

SIMPLE

COMPOUND

DOUBLY COMPOUND

MARGIN

ENTIRE

SERRATE

DOUBLE SERRATE

LOBES

PINNATE

PALMATE

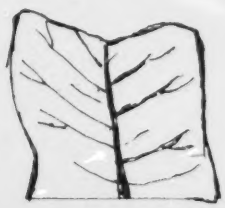
SHAPE-APICES

ACUTE

ACUMINATE

CUSPIDATE

ROUNDED



TRUNCATE

SHAPE BASES

CUNEATE

ACUTE

ROUNDED

CORDATE

TRUNCATE

OBLIQUE

SUMMER KEY TO MINNESOTA'S TREES

CONIFERS (Evergreens, Softwoods)

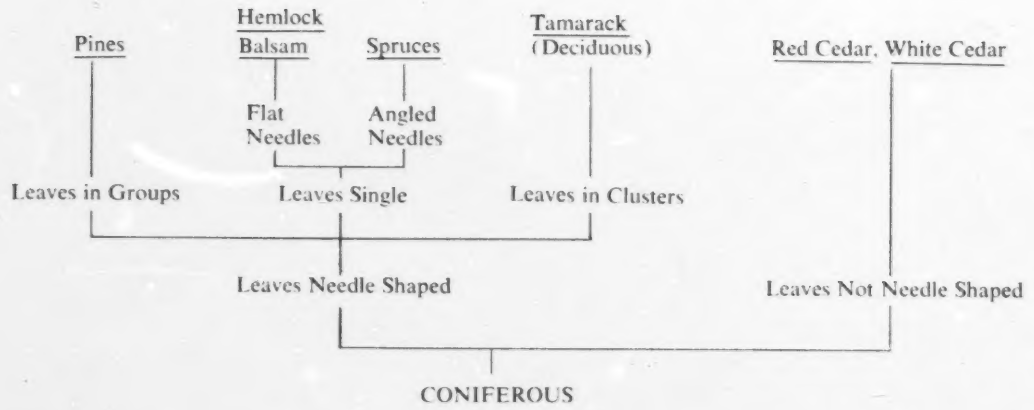
1. Leaves needle like, awl shaped or scale like; usually evergreen.
   2. Leaves needle like.
      3. Needles borne in clusters.
         4. Cluster containing 2-5 needles (pines).
            5. Needles in clusters of 2.
               6. Needles 4 to 6 inches long, snap cleanly when folded. — *Red pine*
               6. Needles 1½ to 4 inches long, slightly to strongly twisted.
                  7. Needles widely spread, cones often remain closed. — *Jack pine*
                  7. Needles close together, cones point to main stem. — *Scotch pine*
            5. Needles in clusters of 2 or 3, 5 to 11 inches long. — *Ponderosa pine*
            5. Needles in clusters of 5, flexible, 3 to 5 inches long. — *Eastern white pine*
         4. Needles in clusters (more than 5) on short, spurlike branches, single leaves on new twigs, not persistent in winter. — *Tamarack*
      3. Needles borne singly, persistent year-round.
         8. Needles flattened in cross section.
            9. Lower surface whitened, not constricted at base. — *Balsam fir*
            9. Lower surface whitened, but constricted at base, tips sometimes notched. — *Eastern hemlock*
         8. Needles rectangular in cross section.
            10. Needles yellow-green, twigs orangish. — *Norway spruce*
            10. Needles bluish-green.
               11. Needles 1 to 1¼ inches long, sharp tipped. — *Blue spruce*
               11. Needles 1/3 to ¾ inch long, not as sharp.
                  12. Needles have "stinky" odor when crushed, trees the same; "cat" spruce, twigs hairless. — *White spruce*
                  12. Needles blunt, twigs hairy, cones persistent. — *Black spruce*
   2. Leaves awl shaped or scale like.
      13. Needles scale like and awl shaped; fruit a blueberry-like cone. — *Eastern redcedar*
      13. Needles scale like, very aromatic; fruit a small cone. — *Northern white cedar*

DECIDUOUS (Broadleaves, Hardwoods)

1. Leaves broad, thin; not persistent over winter.
   14. Leaves opposite.
      15. Leaves simple.
         16. Leaves pale green on undersurface, clefts rounded, lobes sparsely toothed. — *Sugar maple*
         16. Leaves silvery white beneath, usually 5-lobed, clefts deep. — *Silver maple*
         16. Leaves whitish beneath, usually 3-lobed, clefts shallow and sharp angled. — *Red maple*
      15. Leaves compound.
         17. Three to seven very variable leaflets, coarsely toothed. — *Boxelder*
         17. Five to eleven symmetrical leaflets, finely toothed (Ashes).
            18. Five to nine oval leaflets with stems, whitish below. — *White ash*
            18. Seven to nine lance-shaped leaflets with stems, light green below. — *Green ash*
            18. Seven to eleven oval leaflets without stems, whitish below. — *Black ash*
   14. Leaves alternate.

19. Leaves simple.
    20. Leaves entire, not lobed or deeply cut.
        21. Leaf margins serrate.
            22. Leaves heart-shaped, serrations coarse. — *Basswood*
            22. Leaves linear, serrations fine; pinnately veined. — *Willow*
            22. Leaves lanceolate to ovate.
                23. Shiny, oblong, leathery leaves; twigs with bitter almond taste. — *Black cherry*
                23. Dull, soft leaf with 3 basal veins; warty or corky bark. — *Hackberry*
            22. Leaf rounded or triangular, pith star-shaped.
                24. Leaf stem flattened, leaves triangular, leaf margin toothed. — *Eastern cottonwood*
                24. Leaf stem flattened, leaves rounded, leaf margin serrate. — *Quaking aspen*
                24. Leaf stem flattened, leaves rounded, leaf margin toothed. — *Bigtooth aspen*
                24. Leaf stem rounded, leaves egg-shaped, leaf margin serrate with rounded teeth. — *Balsam poplar*
        21. Leaf margins doubly serrate.
            25. Base of leaves oblique (Elms).
                26. Leaf upper surface very rough. — *Slippery elm*
                26. Leaf upper surface not as rough or smooth, twigs smooth. — *American elm*
                26. Leaf upper surface smooth, twigs corky. — *Rock elm*
            25. Base of leaves not oblique.
                27. Twigs with faint wintergreen odor, trunk yellowish, papery bark. — *Yellow birch*
                27. Twigs without faint wintergreen odor.
                    28. Bark on trunk white, papery, often grows in clumps. — *Paper birch*
                    28. Bark on trunk light gray-brown, thin scales, leaf very soft. — *Ironwood*
                    28. Bark on trunk thin, reddish-brown, usually short and thorny. — *Wild plum*
    20. Leaves lobed—not entire (Oaks).
        29. Lobes with bristle tips (sharp points).
            30. Lobes separated by rounded openings extending over halfway to midrib, bright red in early fall; acorn often striped and ½ enclosed in cup. — *Northern pin oak*
            30. Lobes separated ½ distance to midrib; dull green above, paler below, red in fall; large acorn in shallow cup. — *Northern red oak*
        29. Lobes rounded, not bristle tipped.
            31. Lobes generally even in length; fruit in warty cup. — *White oak*
            31. Lobes longer at outer tip, clublike; fruit in fringed cup. — *Bur oak*

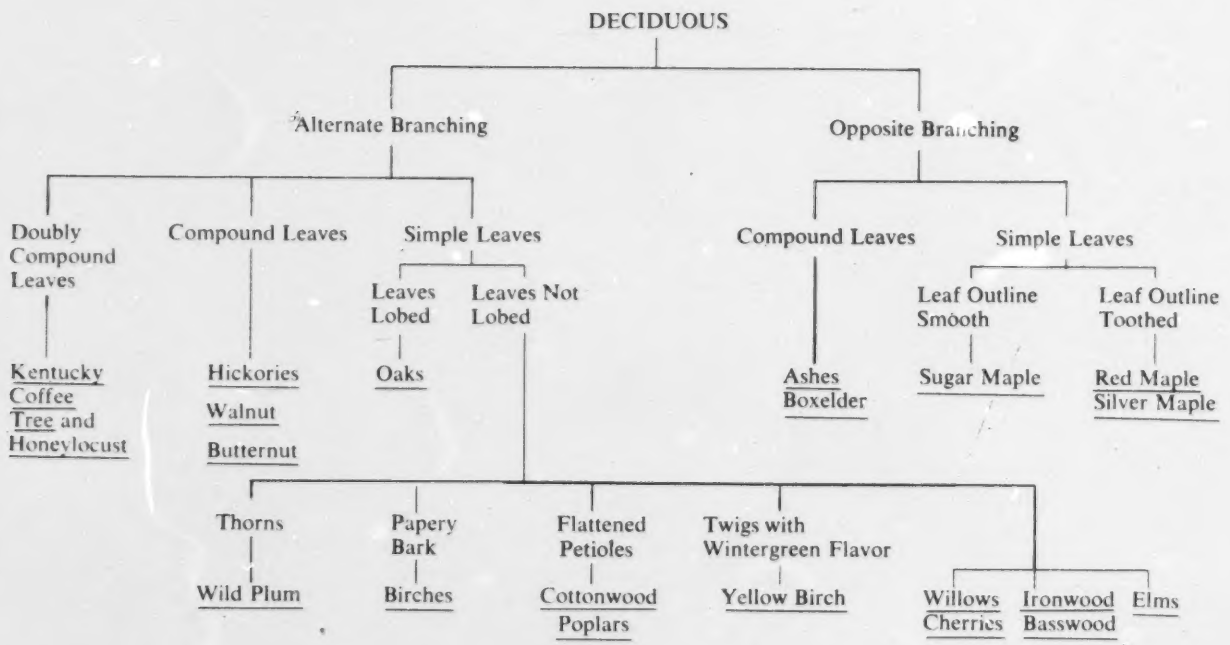
19. Leaves compound.
    32. Leaves only once compound.
        33. Five to nine finely toothed leaflets; pith of twigs solid.
            34. Five elliptical leaflets, upper three much larger than lower two. — *Shagbark hickory*
            34. Five to nine lance-shaped leaves, no marked difference in size. — *Bitternut hickory*
        33. Eleven to 23 leaflets; pith of twig chambered.
            35. Eleven to 19 leaflets, downy beneath. — *Butternut*
            35. Eleven to 23 leaflets, smooth beneath. — *Black walnut*
    32. Leaves doubly compound.
        36. Large leaflets, on thick twigs without spines, fruit a wide, thick-shelled pod. — *Kentucky coffee tree*
        36. Very small leaflets, on slender twigs with spines on twigs, branches, and trunk; fruit a long, twisted pod. — *Honeylocust*



What kind is your tree?

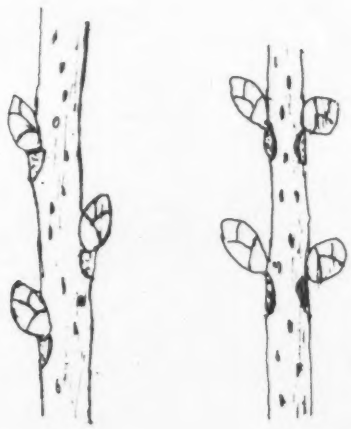
TREE ROAD MAP

Read the signs, follow the arrows



TWIG AND BUD CHARACTERISTICS—WINTER KEY

ARRANGEMENT

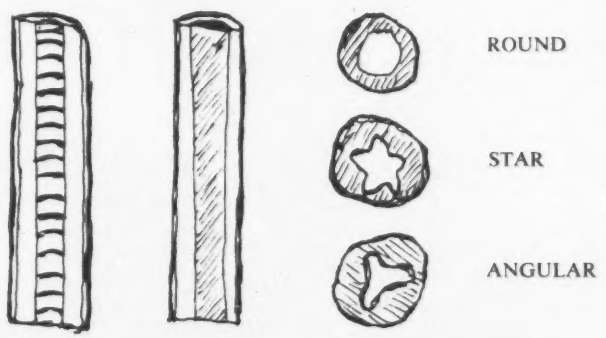


ALTERNATE OPPOSITE

SIZE

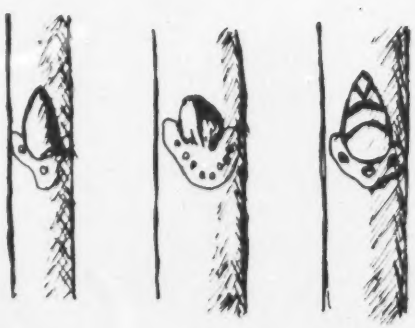
STOUT SLENDER

PITH



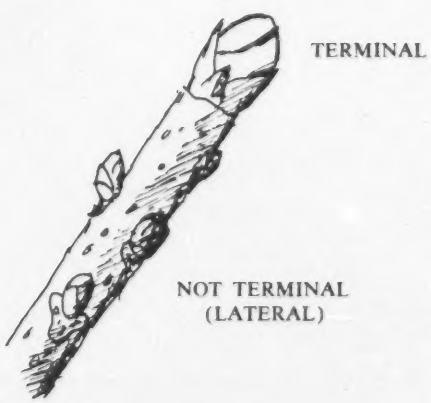
CHAMBERED SOLID

BUD SCALES



ONE TWO MANY

BUDS



WINTER KEY TO MINNESOTA'S TREES

1. Leaves persistent and green throughout the winter, needle shaped, awl shaped or scale like (see Summer Key—Conifers).
1. Leaves not remaining on trees throughout winter.

2. Twigs with small, wart-like branches. — *Tamarack*
2. Twigs without small, wart-like branches.

3. Buds and leaf-scars opposite each other on twigs.

4. Twigs slender, red to brown or green to purple; buds red or brown.

5. Buds narrow, brown, sharp pointed. — *Sugar maple*
5. Buds broad, reddish, usually blunt pointed.

6. Buds with silvery fuzz; twigs green to purple. — *Boxelder*
6. Buds smooth; twigs red to brown.

7. Buds brown and pointed; twigs brown. — *Silver maple*
7. Buds red and rounded; twigs red. — *Red maple*

4. Twigs stout, gray to brown; buds brown or black.

8. Buds black; older bark grayish, scaly, rubs off easily. — *Black ash*
8. Buds dark brown; older bark furrowed or ridged.

9. Twigs often fuzzy; leaf scar usually straight on upper edge. — *Green ash*
9. Twigs smooth; leaf scar usually deep notched on upper edge. — *White ash*

3. Buds and leaf scars alternate on twigs.

10. Fruit a pod; persists on tree over winter.

11. Fruit a long twisted pod, thin skinned with many small black seeds. — *Honeylocust*
11. Fruit a stout pod, thick skinned with three to six large brown seeds. — *Kentucky coffee tree*

10. Fruit not a pod.

12. Pith of twig chambered.

13. Pith chocolate color; fuzzy "mustache" above leaf scar. — *Butternut*
13. Pith light brown color; leaf scar deeply notched. — *Black walnut*

12. Pith of twig solid.

14. One or three bud scales covering bud.

15. One cup-like scale covering bud. — *Black willow*
15. Three greenish to reddish bud scales. — *Basswood*

14. More than five bud scales covering bud.

16. Buds covered with dense yellow fuzz obscuring scales. — *Bitternut hickory*
16. Bud scales plainly visible.

17. Bud scales loose and shaggy, grayish brown. — *Shagbark hickory*
17. Bud scales tight and overlapping.

18. Lowest bud scale of side buds directly over leaf scar.

19. Buds are very sticky when squeezed.

20. Buds with very sweet aromatic odor. — *Balsam poplar*
20. Buds odorless. — *Eastern cottonwood*

19. Buds slightly sticky.

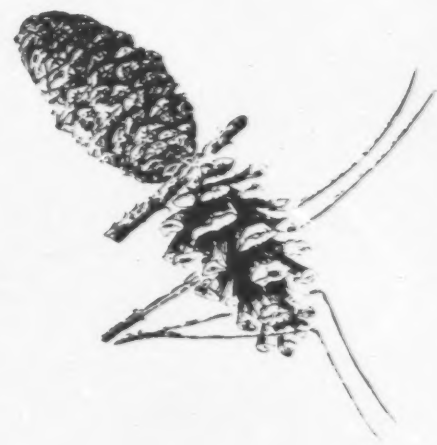
21. Buds appear varnished. — *Quaking aspen*
21. Buds covered with sparse white down. — *Bigtooth aspen*

18. Lowest bud scale of side buds not centered over leaf scar.

22. Several buds clustered at tip of twig.
    23. Buds pointed, light brown.
        24. No cork on twigs, older bark in long, flat ridges. *Northern red oak*
        24. Older twigs corky, older bark in coarse, scaly ridges. *Bur oak*
    23. Buds not pointed, reddish brown.
        25. Buds broadly oval, upper half woolly; twigs light red. *Northern pin oak*
        25. Buds rounded; twigs greenish red to gray. *White oak*

22. Only one bud at tip of twig.
    26. Twigs with strong odor.
        27. Crushed twig with pleasant wintergreen odor. *Yellow birch*
        27. Crushed twig with unpleasant bitter-almond odor; no spines on trunk. *Black cherry*
        27. Crushed twig with unpleasant almond taste, trunk armed with spines. *Wild plum*
    26. Twigs odorless.
        28. Older bark white and papery. *Paper birch*
        28. Older bark gray to brown in narrow ridges and fairly firm to spongy.
            29. Buds sharp pointed, older twigs corky.
                30. Lateral buds small and closely pressed to twig; twig slender and zigzag. *Hackberry*
                30. Lateral buds larger and not appressed; twig medium and not zigzag. *Rock elm*
            29. Buds dull-pointed, twigs corkless.
                31. Buds and twigs brown, with soft hair. *American elm*
                31. Buds blackish, twigs gray, with bristly hair. *Slippery elm*
        28. Older bark gray, shreddy and loose; a small tree. *Ironwood*

TREE IDENTIFICATION



RED PINE *Pinus resinosa*
(Norway pine)

Key Features: Two long, dark-green needles that break cleanly when folded in two; scaly to platy reddish bark.

EASTERN WHITE PINE *Pinus strobus*

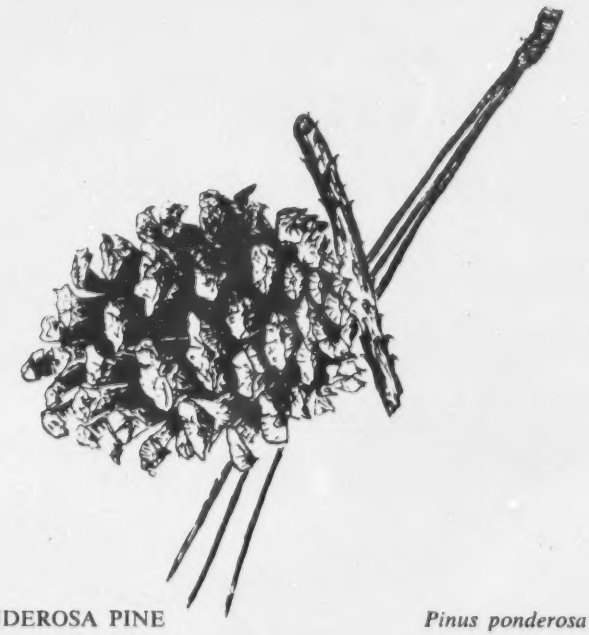
Key Features: Five slender flexible needles per cluster, long light-brown cones, dark-brown blocky bark on old trees.

SCOTCH PINE *Pinus sylvestris*

Key Features: Orange-brown bark; cones point to main stem; two short needles twisted and close together. Stem and trunk often twisted.

JACK PINE *Pinus banksiana*

Key Features: Closed, persistent cones that point to the end of the branch, bundles of two widely spreading needles, dark scaly bark.



PONDEROSA PINE *Pinus ponderosa*
(Western yellow pine)

Key Features: Long needles, two or three in each bundle (the only pine in Minnesota with three). Needles don't break evenly as with Red pine. Cone 3 to 6 inches long, shaped like a top, armed with small spines. An introduced tree, common in western Minnesota windbreak plantings.

WHITE SPRUCE *Picea glauca*

Key Features: Pungent odor to crushed needles, often called "cat" or "stinking" spruce. 2-inch shiny brown cones, hairless twigs. Generally found on upland sites.

BLACK SPRUCE *Picea mariana*

Key Features: Dark, hairy twigs, short blue-green needles, small, persistent cones. Commonly found in moist locations.

NORWAY SPRUCE *Picea abies*

Key Features: Drooping branchlets on mature tree, orange twigs, large, light brown cones. Introduced from Europe as an ornamental and windbreak tree.

BLUE SPRUCE *Picea pungens*
(Colorado blue spruce)

Key Features: Needles 1-1½ inches long, sharp tipped, often bluish-green to silvery blue. Cones 2-3 inches long, cone scale margins wavier than other spruce. An introduced tree commonly found as an ornamental and in windbreaks.

BALSAM FIR *Abies balsamea*

Key Features: Spire-shaped tree with blisters on bark. Older branches dotted with flat circular needle scars. Cone usually erect and breaks up readily. Found in moist soils.

NORTHERN WHITE CEDAR *Thuja occidentalis*
(Arborvitae)

Key Features: Scale-like leaves "braided' 'in pairs at right angles to adjoining pairs, lustrous yellow-green and aromatic foliage in flattened fan-like sprays.

EASTERN HEMLOCK *Tsuga canadensis*

Key Features: Row of needles lying on top of twig; tip of tree bends away from wind; small brown cones. Very few in the state.

EASTERN REDCEDAR *Juniperus virginiana*

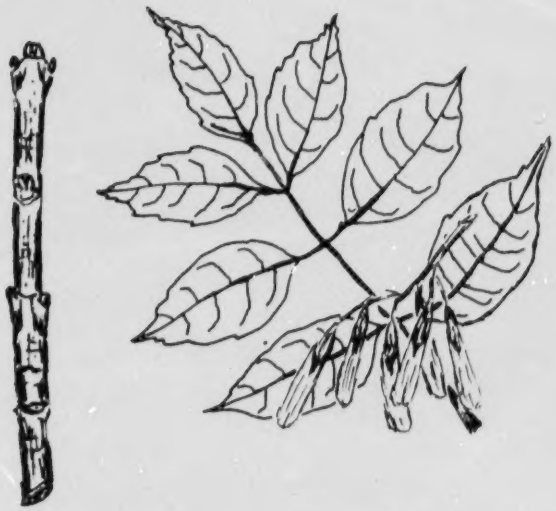
Key Features: Columnar form, two types of leaves, reddish shreddy bark. Cone is a bluish berry.

TAMARACK *Larix laricina*

Key Features: Clusters of needles on short shoots, deciduous needles turn gold and fall in autumn, small upright cones. Found in Minnesota lowlands and bogs.

BLACK ASH *Fraxinus nigra*

Key Features: Commonly found in cold, moist locations — a common hardwood in swamps or along stream banks. Usually 7-13 leaflets are not stalked. Fruit usually twisted with thin wing nearly surrounding the seed.

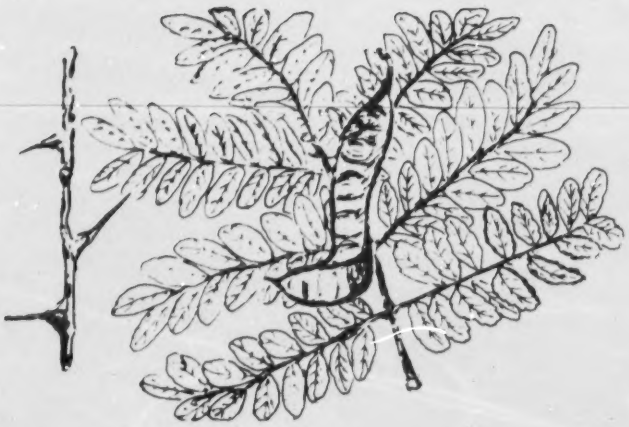


WHITE ASH *Fraxinus americana*

Key Features: Usually seven oval leaflets with whitish lower surface; tight crisscrossed bark; "paddle-shaped" fruit.

GREEN ASH *Fraxinus pennsylvanica*

Key Features: Seven to 19 lance-shaped, shiny green leaflets; tight, flaky crisscrossed bark; narrow "oar-shaped" fruit.



HONEYLOCUST *Gleditsia triacanthos*

Key Features: Leaves are doubly compound (rarely singly compound) with main leaf stem branched and 15 to 30 leaflets on each branch. Fruit is a reddish-brown twisted flat pod up to 18 inches long and 1-2 inches wide. Strong straight sharp spines on branches (there are cultivated varieties without spines).

KENTUCKY COFFEETREE *Gymnocladus dioicus*

Key Features: Leaves large, doubly compound on thick twigs, mottled in color. Fruit is a wide, thick-shelled pod with 2 or more dark, bony seeds. Old bark is in plates with sharp edges. No thorns.

PAPER BIRCH *Betula papyrifera*

Key Features: Chalky, white, papery bark; preformed male catkins on twigs; twigs feel rough.

YELLOW BIRCH *Betula alleghaniensis*

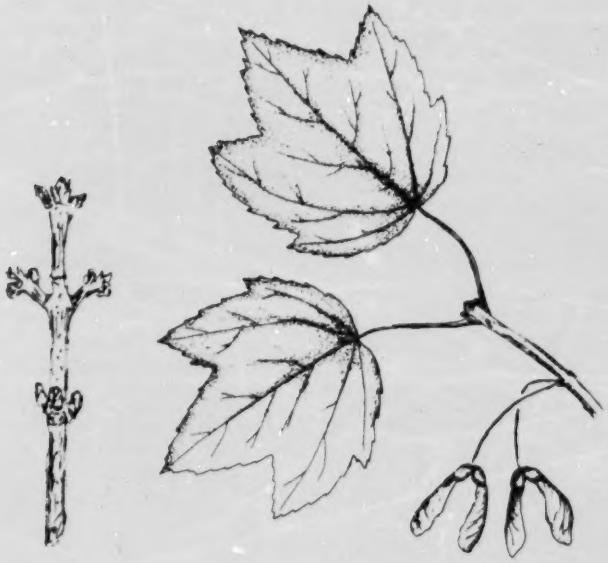
Key Features: Shiny, bronzed bark peeling into thin horizontal strips; aromatic flexible twigs, oval double-toothed leaves.

SUGAR MAPLE *Acer saccharum*
(hard maple)

Key Features: Five-lobed, dark green leaves, dark brown twigs with pointed brown buds, variable dark gray bark.

SILVER MAPLE *Acer saccharinum*
(soft maple)

Key Features: Leaves are silvery-white beneath, clefts between lobes are deep, margin is more toothed, deeper lobed than sugar maple. Fruit is 1-2½ inches long, winged pair spreading far apart.

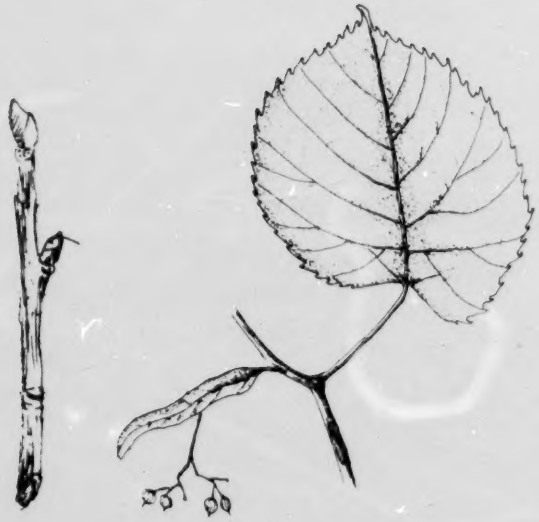


RED MAPLE *Acer rubrum*

Key Features: Three-lobed leaves that are whitish below, dark red twigs and buds, smooth gray bark that breaks up into flaky strips.

BOXELDER *Acer negundo*

Key Features: Irregularly toothed compound leaves, stout whitish twigs, clusters of brownish-winged fruit.



AMERICAN BASSWOOD *Tilia americana*

Key Features: Large, coarsely toothed, heart-shaped leaf; reddish zigzag twigs with large mucilaginous buds; light brown nutlets hanging from yellow strap.

BLACK WILLOW *Salix nigra*

Key Features: Slender reddish-brown twigs with small buds; shiny dark green leaves with hooked tip; dark, ridged-to-platy bark. There are many types of willow in Minnesota. Most have the very slender leaves.

BLACK CHERRY *Prunus serotina*

Key Features: Finely toothed dark green leaves with red fuzz on lower midrib; silvery bitter tasting twigs; black platy scaled bark with upturned edges.

HACKBERRY *Celtis occidentalis*

Key Features: Bark is warty, ridgy, cork-like with many thin layers. Fruit is a small, gray hard berry. Many trees have clumps of small distorted twigs in their tops called "witches' brooms."

EASTERN COTTONWOOD *Populus deltoides*

Key Features: Glossy, green triangular leaf; massive trunk with deeply furrowed gray bark; coarse twigs with sticky, odorless buds.

QUAKING ASPEN *Populus tremuloides*
(trembling aspen, popple)

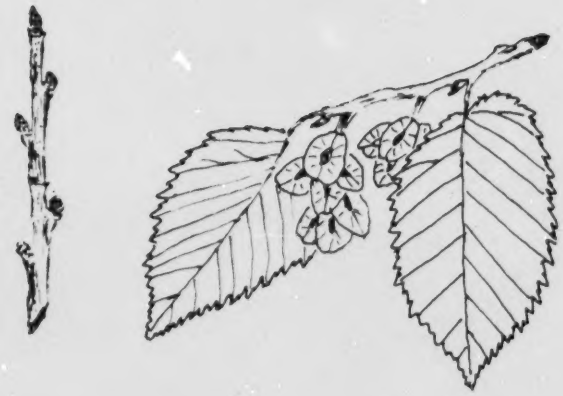
Key Features: Trembling, circular leaves, light greenish-white bark, slender bitter twigs.

BIGTOOTH ASPEN *Populus grandidentata*
(popple)

Key Features: Oval, coarsely toothed leaves; smooth greenish bark when young; buds covered with short, white hair.

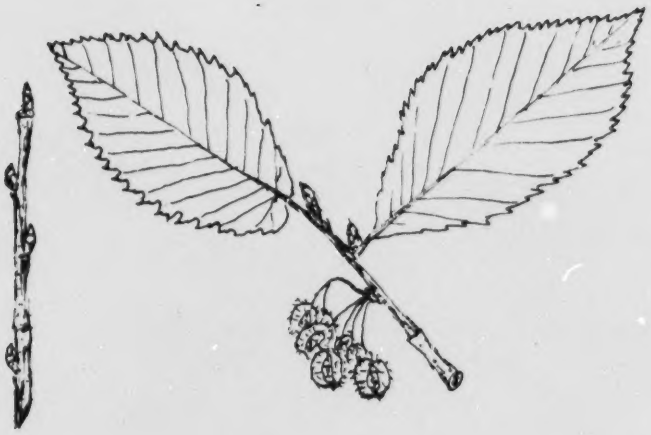
BALSAM POPLAR *Populus balsamifera*
(balm of Gilead)

Key Features: Very conspicuous silver or gold lower leaf surface; sticky, aromatic buds; deeply furrowed gray bark.



SLIPPERY ELM *Ulmus rubra*

Key Features: Dark green, very rough leaves; gray twigs with very dark brown buds; loose, reddish-brown bark. Bark not in alternate layers of brown and white.



AMERICAN ELM *Ulmus americana*

Key Features: Oval, coarsely toothed leaves, slender brown twigs and buds, large spreading "feather duster" crown. Bark in alternate layers of brown and white. Fruit margin is ciliate.

ROCK ELM *Ulmus thomasii*

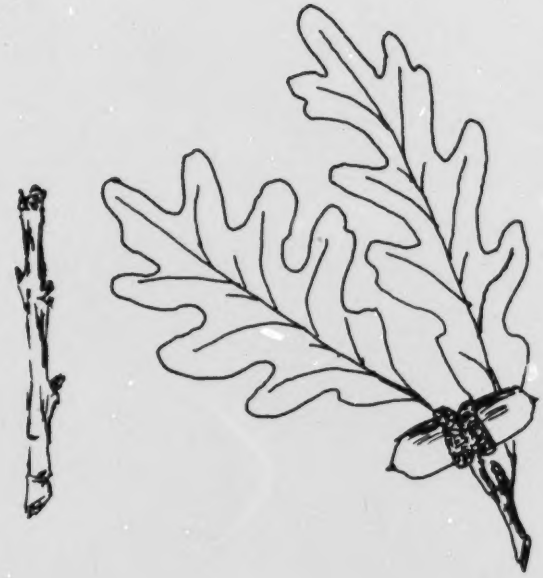
Key Features: Thick, glossy green, toothed leaf; corky twigs with sharp buds; narrow, "shaggy" crown. Bark in alternate layers of brown and white.

IRONWOOD *Ostrya virginiana*
(Eastern hophornbeam)

Key Features: A small tree usually found growing under other hardwoods. Leaves are very soft to touch. Bark is "shreddy" in thin, narrow, loose ridges. Fruit is a loosely formed green pod resembling that of a hop vine.

NORTHERN RED OAK *Quercus rubra*

Key Features: Leaves with seven to 11 bristle-tipped lobes; large shallow-cupped acorns; bark ridged with light gray inverted "ski tracks."

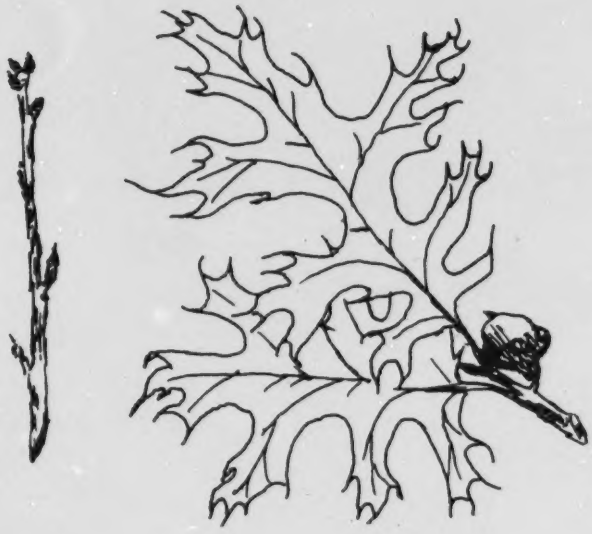


WHITE OAK *Quercus alba*

Key Features: Leaves with five to nine rounded lobes; gray, flaky bark with large smooth patches; shallow, warty cup at base of nut.

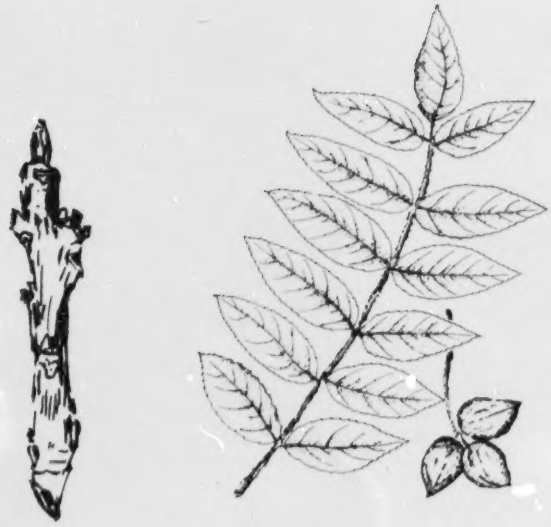
BUR OAK *Quercus macrocarpa*

Key Features: Large leaves with deeply indented central lobes; corky twigs, large fringed acorns.



NORTHERN PIN OAK *Quercus ellipsoidallis*

Key Features: Dark green variable leaves; rough, blocky, black bark; acorn cup covered with loose, dull brown scales.



BUTTERNUT *Juglans cinerea*

Key Features: Compound downy leaves; stout twigs with "mustache," light gray, flat-ridged bark. Twigs with chocolate colored pith.

BLACK WALNUT *Juglans nigra*

Key Features: Compound, smooth leaves; stout twigs with buff, chambered pith; dark sharply ridged bark.

BITTERNUT HICKORY *Carya cordiformis*

Key Features: Long sulfur-yellow buds; seven to nine bright green, lance-shaped leaflets; gray, smooth, slightly ridged bark.

SHAGBARK HICKORY. *Carya ovata*

Key Features: Compound leaf of five leaflets, the upper three much larger; shaggy, budded twigs; coarse, shaggy bark.

WILD PLUM *Prunus americana*
(American plum)

Key Features: Shrub or small tree, white flowers in spring, dark-green leaves and red and yellow fruit. Bark thin, reddish brown, broken into thin plates. Trunk usually short and thorny.

OTHER REFERENCES:

TREES OF MINNESOTA, Section of Documents, Room 140, Centennial Building, St. Paul 55101. $0.40.

TREES OF THE EASTERN AND CENTRAL U.S. AND CANADA, W. M. Harlow, Dover Publications, Inc., 180 Varick St., New York 10014. $1.50.

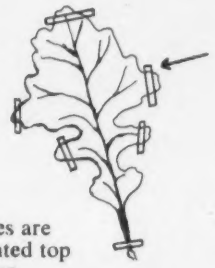
KNOWING YOUR TREES, G. H. Collingwood and W. D. Brush, the American Forestry Association, 919-17th St., N.W., Washington, D.C. 20006. $7.50.

NATIVE TREES OF CANADA, Canadian Government Bookshop, Mall Center Building, 499 Portage Ave., Winnipeg, Manitoba, Canada. $3.

PROJECTS

Mounting Tree Leaves

After pressing, leaves should be mounted on cardboard and labeled to show their common names, their scientific names, where they were found, and the date collected. Be careful when mounting the leaves. Make your arrangements neat and attractive.



Use Scotch tape or Elmer's Glue

Common name: Bur oak
Scientific name: *Quercus macrocarpa*
Where found: Fort Snelling
Date: May 21, 1970

Leaves are mounted top side up

Leaf Prints

Leaf printing is a good method of making a permanent collection of leaves. All that is needed is a stamp pad, (the larger the better), white paper (typewriter paper is fine), newspapers, and your leaves. Press the leaves for an hour between newspapers. This will flatten them and make them easier to print. Then place the leaf *under-surface down*, on the stamp pad: Cover the leaf with one thickness of newspaper and rub it firmly to get ink on the margin, the stem, and the veins. If the leaf is larger than the stamp pad you will have to move the leaf around to get ink over the entire under-surface. Place the inked leaf on your paper. Cover the leaf with one thickness of clean newspaper and rub thoroughly. Be sure to rub all the leaf and do not let it slip or you will spoil the print. Remove the leaf from your paper and there is your print. Label these pages neatly and bind them into a nature notebook. Girls carrying this project might be interested in using leaves with textile paints to make designs on material.

Activities

1. Collect during the summer, identify and mount according to instructions, leaves from 25 different kinds of Minnesota trees.
2. Collect during the year, fruits such as cones, nuts, and acorns from 10 different trees. Identify these fruits, label them, and make a case in which they may be attractively displayed.
3. Select a large tree near your home or school that you can study and keep records on during the year.
4. Exhibit your leaf collection, fruit collection, project report, and record of activities at your club or community exhibit or fair in a scrapbook or display box.
5. During the winter collect, identify, and mount twigs from 12 Minnesota trees. Exhibit these with your leaf collection.
6. Make an educational exhibit on some phase of forestry and display it in a local store window or at a county fair or community exhibit. Exhibits encouraging forest fire prevention, tree planting, or forest management are recommended.
7. Make a collection of 15 leaf prints of Minnesota trees and shrubs. Identify and label them just as you did with your regular collection.
8. Certain trees have characteristic fall leaf coloration. List at least 15 trees and tell what color each is in the fall.
9. Write an essay on a subject of interest to you, that might be used as a newspaper article or a talk. You might want to write about our state tree and how it was chosen, or about your favorite tree and why you selected it as your favorite.

Suggested Visual Presentations

1. Identifying trees by leaf characteristics
2. Collecting, pressing, and mounting tree leaves
3. Making leaf prints
4. Using a plant key in tree identification
5. Making a display box for exhibiting fruits.

Your Leaf Collection

When you go out to collect leaves it is a good idea to take a newspaper or a large magazine along. Put the leaves between the pages of the paper to keep them from drying out too fast and protect them from being torn or broken. Be sure to press the leaves as soon as you can. If you need help in identifying some of the leaves, your club leader or school teacher will be glad to help, *but* before you ask for help try to find out yourself by using a botany book from the school library or perhaps a book at home. Remember there is a great satisfaction in doing a good job by yourself.

Tips on Collecting Leaves

1. Do your collecting in mid-summer so you will get mature leaves.
2. Avoid fruit or orchard trees — you are mainly interested in forest trees.
3. Select good leaves. Avoid insect-eaten or torn leaves.
4. *Most Important*: Make sure you have the whole leaf and not just a leaflet when collecting specimens from trees such as walnut, honeylocust, or others that have compound leaves.
5. When collecting leaves, carry a newspaper with you and slip the leaves you collect between the pages. Be sure they are flat. This will prevent the leaves from curling and becoming difficult to press.

Instructions for Pressing Leaves

1. Press and dry your leaves by laying them flat between sheets of newspapers or some other kind of porous paper.
2. Use heavy weights such as bricks so your leaves will be pressed flat. Don't try to press too many leaves at one time and be sure to change the papers every two days.
3. Use plenty of dry newspapers. If the papers are not changed frequently your leaves may mildew.

Constructing a Fruit Display Box

Since tree fruits are very irregular in size and do not lend themselves to simple mounting techniques, it is desirable to construct a display box in which all of them may be kept. A container can easily be made from a shoe box, or a box of similar size, cut to a height of about 2 inches. It may be covered with cellophane or a similar material. Fill the box with cotton and arrange the fruits neatly in it. Any number of fruits may be put in the box as long as they are arranged neatly and are not too crowded. Place name tags near each specimen for its identification. The appearance of your box may be greatly improved by covering it with cloth, wallpaper, or a similar attractive material. Its strength may be increased by reinforcing the corners with tape.

Mention of commercial names does not imply endorsement nor does failure to mention a name imply criticism by the Minnesota Agricultural Extension Service.

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